

## Urban Forest Health Workshop

### New Villains and Old Friends in the Urban Disease Landscape

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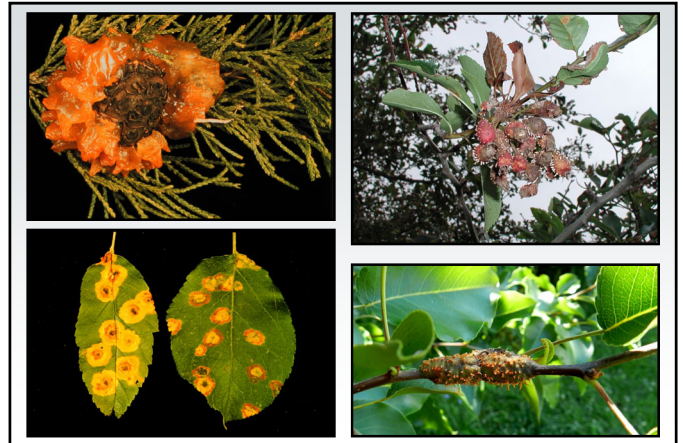


## New Villains and Old Friends Gymnosporangium Rusts

- Pathogens: *Gymnosporangium* spp.
  - *Gymnosporangium juniperi-virginianae* (Cedar-apple rust)
  - *Gymnosporangium globosum* (Cedar-hawthorn rust)
  - *Gymnosporangium clavipes* (Cedar-quince rust)
  - *Gymnosporangium yamadae* – NEW! (Lipstick rust/Japanese apple rust)

## New Villains and Old Friends Gymnosporangium Rusts

- Hosts
  - Junipers
  - Rosaceous plants
    - Apple, crabapple
    - Hawthorn
    - Quince
    - Pear
    - Serviceberry
- Favorable environment: Wet weather



## New Villains and Old Friends Gymnosporangium Rusts

- Control
  - Grow only junipers or rosaceous hosts
  - Use resistant cultivars/varieties
    - “Disease and Insect Resistant Ornamental Plants: Juniperus (Junipers)” (<https://ecommons.cornell.edu/handle/1813/56372.2>)
    - “Home Fruit Cultivars for Northern Wisconsin” (<https://learningstore.extension.wisc.edu/>)
    - “Home Fruit Cultivars for Southern Wisconsin” (<https://learningstore.extension.wisc.edu/>)

## New Villains and Old Friends Gymnosporangium Rusts

- Control
  - Remove galls
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury

## New Villains and Old Friends Gymnosporangium Rusts

- Control
  - Use fungicides to prevent infections (?)
    - Treat rosaceous hosts
    - Chlorothalonil, copper, ferbam, mancozeb, propiconazole, sulfur, and triadimefon
    - Alternate active ingredients (FRAC Codes)
    - Apply when flowers first show color, when half of flowers open, at petal fall, 7 to 10 days after petal fall, and 10 to 14 days later

## New Villains and Old Friends Boxwood Blight

- Pathogen
  - *Calonectria pseudonaviculata*
  - *Cylindrocladium pseudonaviculatum* (*Cylindrocladium buxicola*)
- Hosts
  - Boxwood
  - Pachysandra
- Favorable Environment: Cool, wet weather



## New Villains and Old Friends Boxwood Blight

- Control
  - Be cautious about holiday wreaths
  - Grow shrubs other than boxwood
  - Buy from a reputable supplier
  - Buy locally produced boxwood

## New Villains and Old Friends Boxwood Blight

- Control
  - Grow resistant varieties
    - Hybrid boxwood
      - ‘Green Gem’
      - ‘Karzgreen’ (Green Ice®)
    - Japanese littleleaf boxwood
      - ‘Jim Stauffer’
      - ‘Little Missy’
      - ‘Winter Gem’

## New Villains and Old Friends Boxwood Blight

- **Control**
  - Grow resistant varieties
    - Korean littleleaf boxwood
      - ‘Eseles’ (Wedding Ring®)
      - ‘Franklin’s Gem’
      - ‘Pincushion’
      - ‘Wee Willie’
      - ‘Winter Beauty’
      - ‘Wintergreen’

## New Villains and Old Friends Boxwood Blight

- **Control**
  - DO NOT replant in an area where boxwood blight has been a problem
  - Avoid symptomatic plants
  - Keep new plants isolated
  - Space plants far apart
  - DO NOT overhead water

## New Villains and Old Friends Boxwood Blight

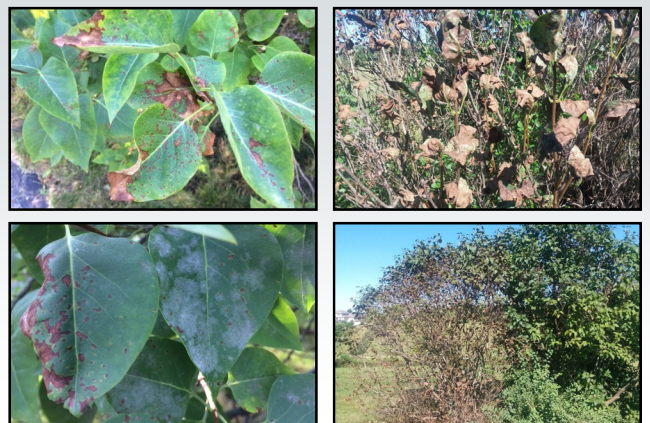
- **Control**
  - Prune out diseased branches
  - Decontaminate (70% alcohol, commercial disinfectants)
  - Remove and destroy infected plants
    - Burn (where allowed)
    - Deep bury (two feet)/Double bag and landfill
    - DO NOT compost

## New Villains and Old Friends Boxwood Blight

- **Control**
  - Use fungicides to prevent infections
    - Chlorothalonil (alone or with propiconazole or thiophanate-methyl), fludioxonil, metconazole, tebuconazole
    - Alternate active ingredients (FRAC codes)
    - Apply at 7 day intervals

## New Villains and Old Friends Septoria Leaf Spot

- **Pathogen:** *Septoria* sp.
- **Host:** Lilac
- **Favorable environment:** Wet weather



### New Villains and Old Friends Septoria Leaf Spot

- **Control**
  - Space lilacs to promote good air flow
  - Routinely thin shrubs
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Avoid overhead watering

### New Villains and Old Friends Septoria Leaf Spot

- **Control**
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Use fungicides to prevent infections
    - Chlorothalonil, copper, mancozeb
    - Apply from bud break through the end of favorable weather
    - Apply at 7 to 14-day intervals

### New Villains and Old Friends Verticillium Wilt

- **Hosts**
  - Many woody ornamentals
    - Common: Maple, ash, redbud, smokebush
    - Newer: Seven son flower, wafer-ash, buttonbush
  - Many vegetables
    - Tomato, potato, pepper, EGGPLANT, cucurbits
  - Many herbaceous plants
    - Common: Purple coneflower, blazing star
    - New: Vervain ('Quartz White')

### New Villains and Old Friends Verticillium Wilt

- **Favorable environment**
  - Cool, wet weather (for infection)
  - Hot, dry weather (for symptom development)



### New Villains and Old Friends Verticillium Wilt

- **Control**
  - Avoid *Verticillium*-infested areas
  - Pretest soils/mulches/composts for the presence of *Verticillium*
  - Fumigate heavily infested soils
  - Keep broad-leaf weeds under control
  - Clean up leaf litter
  - Avoid municipal mulches

## New Villains and Old Friends Verticillium Wilt

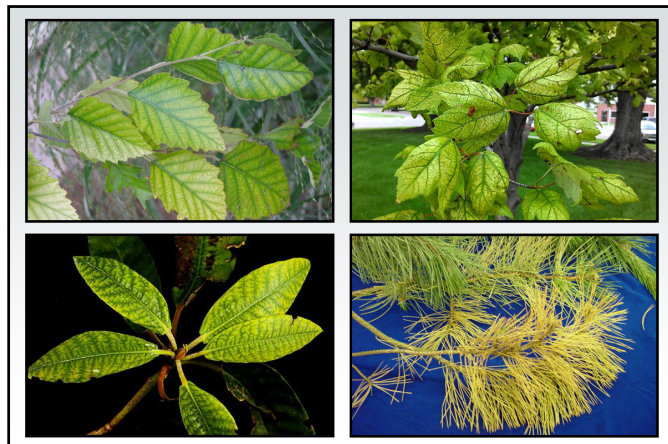
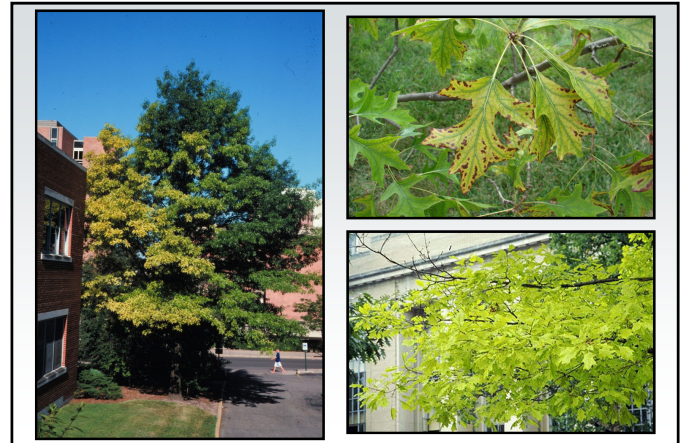
- **Control**
  - Use immune/resistant plants
    - CONIFERS: Pines, spruces, firs, junipers
    - DECIDUOUS TREES/SHRUBS: Beech, birch, ginkgo, hackberry, hawthorn, hickory, honey locust, mountain ash, white oak, bur oak, poplar, serviceberry, sycamore, willow
  - Prevent stress
  - Prune diseased (wilted) areas

## New Villains and Old Friends Verticillium Wilt

- **Control**
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Make plants comfortable until they die
  - Remove and destroy diseased plants/leaves
    - Burn (where allowed)
    - Hot compost (?)
  - DO NOT use fungicides

## New Villains and Old Friends Chlorosis

- **Cause:** Micronutrient (Fe or Mn) deficiency
- **Affected plants**
  - Oaks (especially pin oak)
  - Red maple
  - Rhododendron
  - White pine
  - Blueberries
  - Other woody (and herbaceous) plants



## New Villains and Old Friends Chlorosis

- **Management**
  - Plant the right plant in the right location
  - Monitor soil pH and soil nutrients
  - Decrease pH using sulfur or aluminum sulfate
  - Add chelated Fe and/or Mn as needed
  - Make sure trees are adequately watered
  - Minimize damage to tree root systems

## New Villains and Old Friends Fire Blight

- Pathogen: *Erwinia amylovora*
- Hosts
  - Many woody rosaceous plants
  - Apple, crabapple, pear, hawthorn, mountain-ash, cotoneaster
- Favorable environment
  - Wet weather (but not too wet)
  - Hail (or other wounding)



## New Villains and Old Friends Fire Blight

- Control
  - Plant resistant varieties
    - “Home Fruit Cultivars for Northern Wisconsin” (<https://learningstore.extension.wisc.edu/>)
    - “Home Fruit Cultivars for Southern Wisconsin” (<https://learningstore.extension.wisc.edu/>)
    - “Top Ornamental Crabapples for Wisconsin” (<https://hort.extension.wisc.edu/>)
  - Prune diseased branches

## New Villains and Old Friends Fire Blight

- Control
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Destroy infected materials
    - Burn (where allowed)
    - Deep bury
  - DO NOT over-fertilize with nitrogen

## New Villains and Old Friends Fire Blight

- Control
  - Use bactericides to prevent infections (?)
    - Copper, streptomycin
  - Apply
    - Pre-bloom (copper)
    - During flowering (streptomycin)
  - Apply every
    - Two applications at spaced 4 days apart (copper)
    - Multiple applications spaced 3-4 days apart (streptomycin)

## New Villains and Old Friends Powdery Mildews

- Pathogens
 

|                            |                             |
|----------------------------|-----------------------------|
| – <i>Erysiphe</i> spp.     | – <i>Microsphaera</i> spp.  |
| – <i>Uncinula</i> spp.     | – <i>Sphaerotheca</i> spp.  |
| – <i>Phyllactinia</i> spp. | – <i>Podosphaera</i> spp.   |
| – <i>Blumeria</i> spp.     | – <i>Brasiliomyces</i> spp. |
| – <i>Oidium</i> spp.       | – <i>Ovulariopsis</i> spp.  |
- Hosts: Virtually anything
- Favorable environment: High humidity



### New Villains and Old Friends Powdery Mildews

- **Control**
  - Remove diseased plant material and debris
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Reduce humidity
    - Plant less densely
    - Thin existing stands
  - Use resistant cultivars/varieties

### New Villains and Old Friends Powdery Mildews

- **Control**
  - Use fungicides to prevent infections
    - Dithiocarbamates, myclobutanil, propiconazole, tebuconazole, thiophanate-methyl
    - Sulfur, neem oil, other plant-based oils
    - Baking soda (1.5 Tbsp/gal) and light weight horticultural oil (3 Tbsp/gal)
    - Alternate active ingredients (FRAC Codes)
    - Apply when humidity >60-70%
    - Apply at 7-14 day intervals

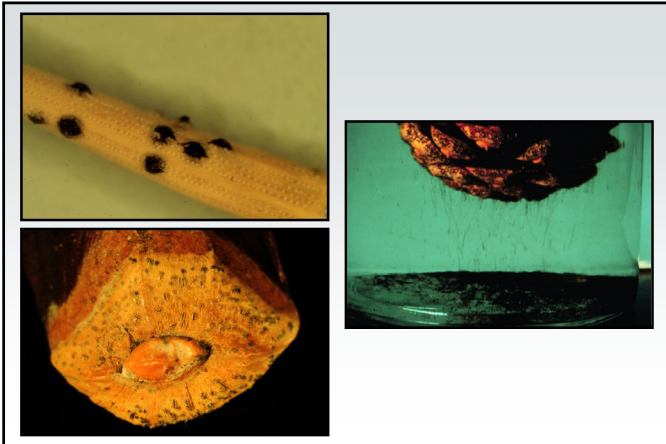
### New Villains and Old Friends Diplodia Shoot Blight and Canker

- **Pathogens:** *Diplodia* spp.  
(*Sphaeropsis* spp.)
- **Hosts (major)**
  - Austrian pine
  - Other pines: red, jack, Scots, mugo
- **Hosts (minor)**
  - Other conifers: cedars, cypresses, firs, spruces, junipers, yews

### New Villains and Old Friends Diplodia Shoot Blight and Canker

- **Favorable environment**
  - Wet weather (for infection)
  - Drought (for extensive colonization)





### New Villains and Old Friends Diplodia Shoot Blight and Canker

- Control
  - DO NOT plant Austrian pines
  - Prevent tree stress, particularly water stress
  - Thin branches to increase airflow
  - Prune diseased branches
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Remove infected cones (?)

### New Villains and Old Friends Diplodia Shoot Blight and Canker

- Control
  - Use fungicides to prevent infections
    - Thiophanate-methyl, chlorothalonil
    - Alternate active ingredients (FRAC Codes)
    - Apply from bud break through shoot elongation
    - Apply at 14 day intervals

### New Villains and Old Friends Rhizosphaera Needle Cast

- Pathogens: *Rhizosphaera kalkhoffii*  
*Rhizosphaera* spp.
- Look-Alike: Stigmina Needle Cast (*Stigmina* spp.)
- Hosts (major)
  - Colorado blue spruce, white (Black Hills)
  - Other spruces: Black, Engelmann, Serbian, Sitka

### New Villains and Old Friends Rhizosphaera Needle Cast

- Hosts (minor)
  - Balsam fir and other firs
  - Pines: Austrian, mugo, eastern white pine
  - Douglas fir
  - Hemlock
- Favorable environment
  - Wet weather
  - High humidity





## New Villains and Old Friends Rhizosphaera Needle Cast

- **Control**
  - DO NOT plant Colorado blue or white spruce
  - DO NOT crowd trees when planting
  - Plant dwarf spruce varieties
  - Thin healthy branches to increase airflow
  - Prevent tree stress
  - Prune diseased branches

## New Villains and Old Friends Rhizosphaera Needle Cast

- **Control**
  - Decontaminate pruning tools (70% alcohol, disinfectants, bleach)
  - Use fungicides to prevent infections
    - Copper, chlorothalonil
    - Alternate active ingredients (FRAC Codes)
    - Start applications at bud break
    - Apply at 3-4 week intervals under favorable conditions

## New Villains and Old Friends Planting-Related Decline

- **Causes**
  - Impatience
  - Improper planting techniques
    - Overly deep planting
    - Failure to remove burlap, wire basket, wires
    - Lack of watering post installation
- **Hosts: Any tree or shrub**



## New Villains and Old Friends Planting-Related Decline

- **Management**
  - Plant small trees
  - Plant bare-root trees
  - Prepare balled and burlaped trees properly
    - Remove burlap
    - Remove wire basket
    - Remove wires/cords
    - Expose the root flare

## **New Villains and Old Friends** Planting-Related Decline

- **Management**
  - **Mulch properly**
    - Use high quality mulches
    - Use the right amount of mulch
  - **Water properly**
    - Apply two inches of water per week
    - Water from bud break through summer and into the fall
    - Continue watering for at least three years

## **New Villains and Old Friends** Where to Go for Help

Plant Disease Diagnostics Clinic  
Department of Plant Pathology  
University of Wisconsin-Madison  
1630 Linden Drive  
Madison, WI 53706-1598  
(608) 262-2863  
pddc@wisc.edu  
<https://pddc.wisc.edu>  
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